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Producing and Marketing Winter Wheat in 4-H : Extension Circular 1-41-2

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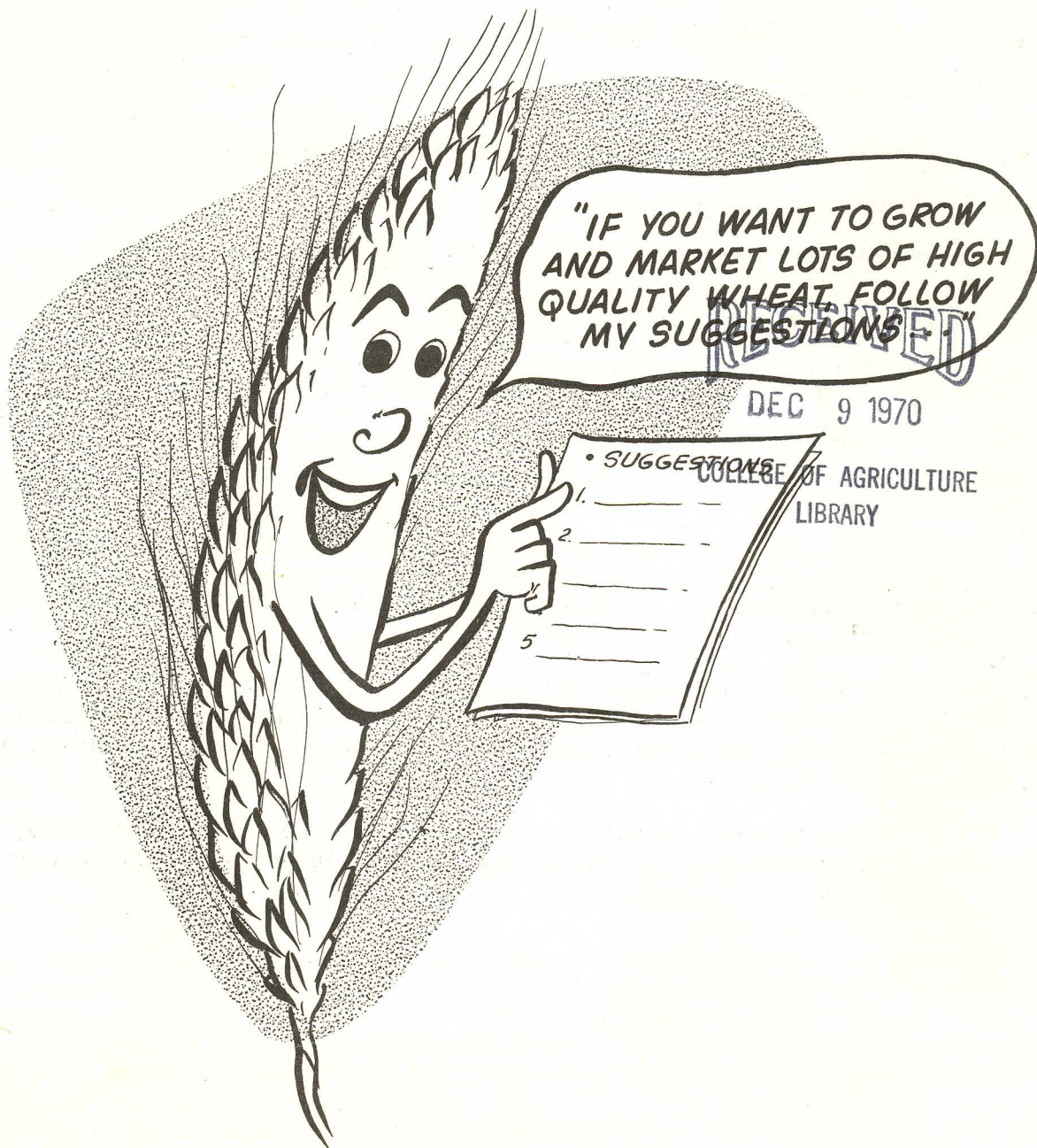
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1956

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Producing & Marketing Winter Wheat in 4-H



EXTENSION SERVICE
UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE
AND U.S. DEPARTMENT OF AGRICULTURE
COOPERATING
W.V. LAMBERT, DIRECTOR

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The purpose of the 4-H Winter Wheat project is to help boys and girls learn the best known methods and practices in winter wheat production. This project offers practical experiences in preparing the seedbed, choosing the best variety, planting, harvesting, storing, marketing, and matters of finance.

Members may choose either (1) a commercial grain production project or (2) a certified seed production project. Beginners will usually prefer the commercial grain production project. Older and experienced members should enroll for at least one year of certified seed production.

If you plan to produce certified seed, ask your county agent for a copy of the "Nebraska Certified Seed Handbook." It will give all needed information about seed certification.

Producing and Marketing Winter Wheat in 4-H

by

J. C. Swinbank

Except on irrigated land or fertile bottoms in Eastern Nebraska, the income from winter wheat is better than that from any other grain crop grown in the state.

Winter wheat ranks second to corn among Nebraska grain crops. Three and a half to four million acres are grown each year.

Nebraska ranks third among the states in the production of hard red winter wheat.

About 80 per cent of Nebraska's wheat is used to make bread flour. It is known throughout the United States for its excellent milling and baking quality.

STARTING AND CARRYING THE WINTER WHEAT PROJECT

Working Out the Project Agreement: You should work out a definite agreement with your parents regarding the number of acres of wheat to be planted, where the land will be located on the farm, and how the crop will be handled from the seedbed preparation to sale of the grain. You should, also, work out an arrangement for the machinery and power used; and have a clear-cut agreement regarding the crop share to give or the cash rent to pay for use of the land. Plans for financing such items as seed, fertilizer, and weed spraying must also be considered.

If these arrangements are made at the beginning of the season, there will be no doubt later as to how the project is to be handled. Parents and club members should make every effort to carry out the project in a business like manner.

Requirements of the Project: You may enroll for either (1) the production of commercial grain for market or (2) the production of certified wheat for seed. In either case you are expected to plant, care for, harvest, and keep a record on at least three acres of winter wheat. A completed record of the project is to be turned in to the club leader before the end of the 4-H club year.

If you produce wheat for commercial purposes, you are also expected to plant a recommended variety for your locality, preferably certified seed. Certification of the crop is not required for a commercial grain project.

If you produce certified seed, you are expected to take the steps necessary for completing official certification of the project. The steps are as follows:

- (1) Check the field for land requirements and field standards. This information can be obtained from the County Extension Office or the Nebraska Crop Improvement Association.
- (2) Apply for field inspection through the County Extension Office not later than May 20.
- (3) Submit sample of threshed grain to the Nebraska Crop Improvement Association for laboratory analysis.
- (4) Attach a copy of the laboratory test report to the project record book.

How to Use This Manual: It is suggested that each topic discussed in this manual be used as the educational theme of a club meeting. The chapters on "Suggested Activities" and "Where To Get More Information" are for the purpose of helping you plan and conduct better club meetings.

This manual is also designed to help you do a better job of producing and marketing high-quality wheat. If you apply the practices suggested in this manual, you will stand a better chance of producing a high yield of top quality wheat.

CHOOSING AND PREPARING THE SEED FOR PLANTING

Choosing the Seed: Plant only good seed of a recommended variety. Good seed is clean and free of variety mixtures, free of weed seeds, and free of rye. The planted seed should be of an adapted variety which is recommended by the Nebraska Agricultural Experiment Station for the locality where the crop is grown.

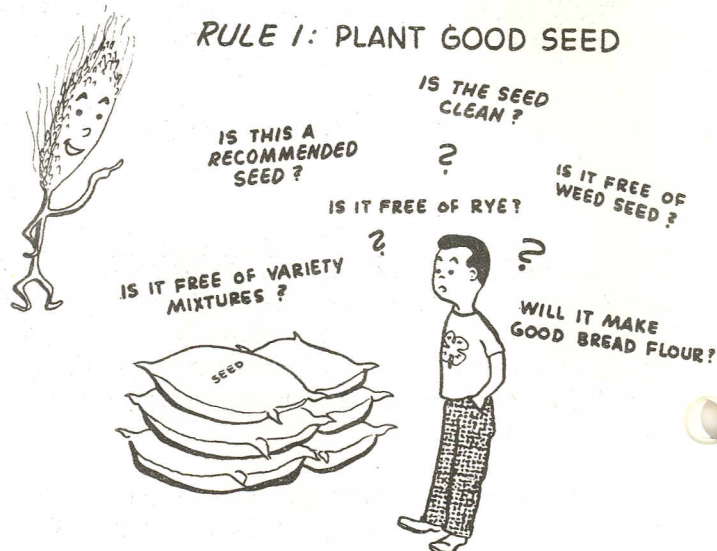
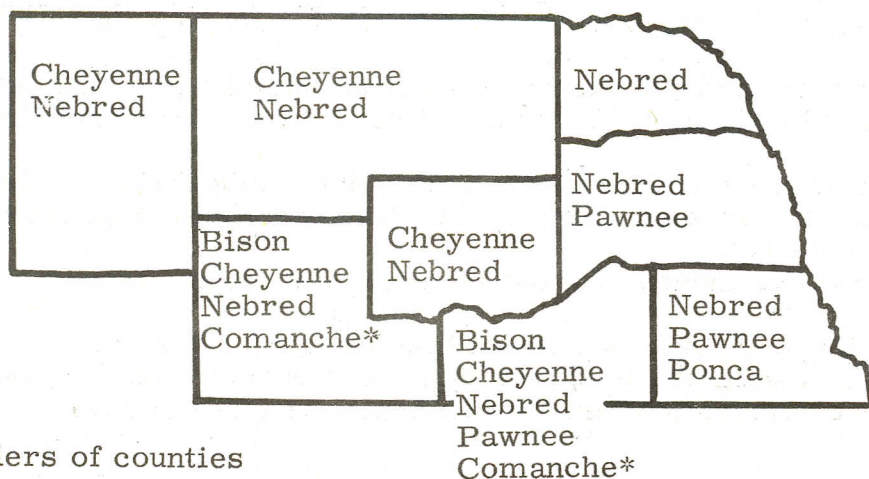
When selecting a variety, consider:

(1) The yield and performance of the variety. It must yield well, have a strong straw which will stand up well for combining, and not shatter when ripe. It must withstand dry weather, cold winters, insect pests, and disease.

(2) The milling and baking characteristics of the variety. About 80 per cent of Nebraska's wheat is made into bakery flour. Bakery flour is a flour that must be "just right" for use in giant mechanical dough mixers and for baking operations that are "timed to the minute." Because wheat differs in milling and baking characteristics, you must produce a variety that has desirable milling and baking qualities, if you are to find a ready market and top price for your grain.

There are more than 200 varieties of wheat grown in the United States. Only a few of these are adapted to Nebraska conditions. It is neither necessary nor desirable for wheat growers to experiment with varieties. That is the job of the Nebraska Agricultural Experiment Station. Different named varieties, plus thousands of experimental varieties, are tested by the Experiment Station each year in order to find the best varieties for each locality. Wheat variety recommendations by the Nebraska Agricultural Experiment Station are based on yield per acre, resistance to disease and insect damage, strength of straw, milling and baking characteristics, and other factors that affect the desirability of a variety. The grower, miller, and baker are all considered.

Varieties shown on the map below are recommended for Nebraska in 1957. Because winter wheat variety recommendations change from time to time, always check with your county extension agent for the recommended varieties in your area. You may also find the



annual publication "Outstate Testing Circular on Fall Sown Small Grain Variety Tests" helpful. Ask your county agent for the most recent copy.

Note: A description of different winter wheat varieties may be found in the USDA Circular No. 938, "Varieties of Hard Red Winter Wheat in the United States."

Cleaning the Seed: After the variety is chosen, examine the seed. If it contains weed seeds, chaff, straw, dirt trash, shriveled or diseased kernels, clean it with a good fanning mill. If it contains noxious weed seeds, do not plant it.

Planting certified seed is an excellent practice. It is usually cleaned before it is sold and no noxious weed seeds are permitted. Also, you are assured of variety pure and rye free seed.

Treating the Seed: As good insurance, treat the wheat seed with materials such as Ceresan "M", Panogne, or some other recommended chemical. Such disinfecting material protects the crop from "stinking" or covered smut and reduces possible losses from disease that may attack the sprouts or young plants. Tests at Kansas State College have shown an increase in stand of 7 1/2 percent from treated seed. Iowa State College reports an average increase in yield of 1.1 bushels per acre from treated seed.

You may treat the seed at home for a cost of 2 to 3 cents per bushel; or you may have it treated by one of the many custom machines that are now being operated throughout the state. For best results, treat the seed several days before planting.

If you treat seed at home, be sure to follow directions on the container. Handle treating materials with care. They are poisonous to animals and human beings.

More information on seed may be found in the part of this manual pertaining to "Maintaining Seed Supplies."

PREPARING THE SEEDBED AND PLANTING THE SEED

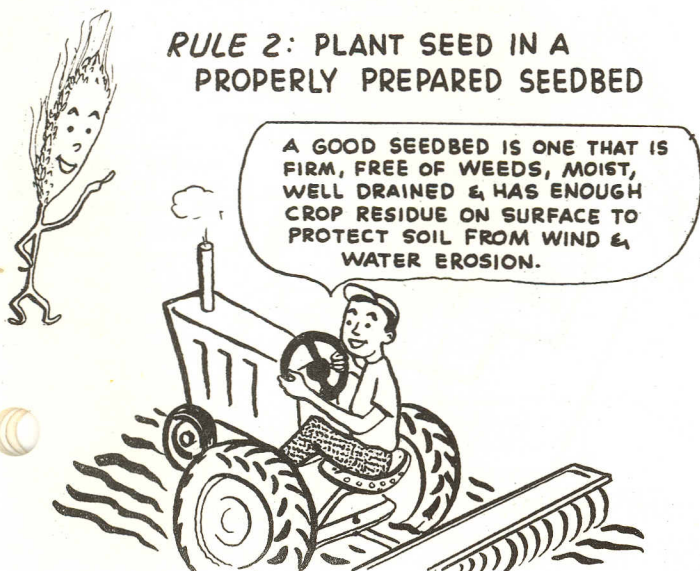
Preparing the Seedbed: Every effort should be made to prepare the seedbed to encourage (1) the development of available nitrates and (2) the conservation of moisture. The seedbed should also be (1) firm, (2) free of weeds, (3) well supplied with plant nutrients, and (4) have enough crop residue on the surface to protect the soil and young plants against either wind or water erosion. Timely tillage is sometimes more important in accomplishing these things than is the type of machine used.

RULE 2: PLANT SEED IN A PROPERLY PREPARED SEEDBED

A GOOD SEEDBED IS ONE THAT IS FIRM, FREE OF WEEDS, MOIST, WELL DRAINED & HAS ENOUGH CROP RESIDUE ON SURFACE TO PROTECT SOIL FROM WIND & WATER EROSION.

The two most common methods of preparing land for wheat are summer fallowing and continuous cropping.

1. Summer Fallowing: Summer fallowing is considered the best method of seedbed preparation for wheat in Western Nebraska and other regions where rainfall is not enough to produce a crop every year. It consists of tilling the land for one or more years during the time when no crop is grown. The most important functions of summer fallowing are (1) to store moisture and (2) to promote the accumulation of available nitrogen. Studies at the North Platte Experiment Station show that an average of about 26 per cent of the moisture received in the fallow year is stored in the soil for the next crop year. This varies from as little as 8 per cent to as much as 41 per cent, depending on weather conditions during the year of fallowing.



If the land is clean tilled, the lack of cover may contribute to soil erosion, from wind and water. Therefore, methods of fallowing in which all vegetative material is left on the surface of the soil is desirable.

Summer fallowing in Nebraska usually starts in April of the year after a crop has been harvested. Leave stubble during the winter to catch snow and prevent wind erosion. Cultivate the standing stubble in the spring with a sub-tiller or one-way disk. Sometimes a moldboard plow is used; but this method does not leave as much crop residue on the surface as other methods. To conserve moisture destroy each crop of weeds when they are small. Till the soil only as often as is necessary to prevent weed growth. Avoid turning up freshly damp soil, because such tillage dries out the soil. If straw and other crop residues are turned under in a "clean fallow" program, the soil should be handled in a manner that will maintain a cloddy surface. Such a surface will help to prevent wind erosion and crusting.

Just prior to seeding it may be well to give the land a final treatment with a plain rod weeder. This will kill small weeds and pack the soil, making an ideal place in which to plant the seed.

During recent years, a new system of preparing wheat land has spread over millions of acres of the Great Plains. Commonly called stubblemulch farming, this method consists of leaving the residue from one crop on the land while the land is prepared for the next crop. This method of fallowing provides a cover for the land, thereby preventing wind and water erosion, increasing the intake of water into the soil, and improving the tilth of the soil. Details regarding this method of summer fallowing will be found in E. C. 54-100, Stubble Mulch Wheat Farming Methods for Fallow Areas."

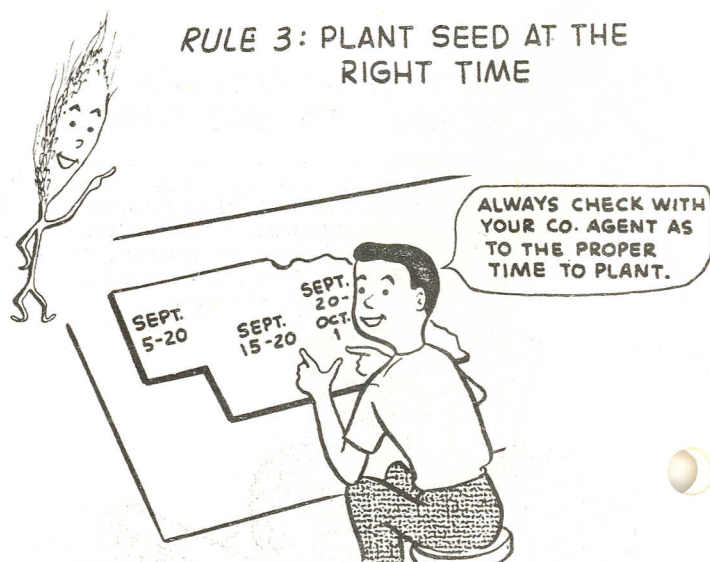
2. Continuous Cropping: In Eastern Nebraska and other areas where summer fallowing is not practiced it is recommended that early seedbed preparation be practiced. Plow and harrow the land in July (immediately after the small grain harvest). Disk the land in August and again just before seeding is recommended. In experiments at the Nebraska Experiment Station, this practice gave yields of 34 bushels per acre compared with 20 bushels per acre for land that was plowed after September 15. If early plowing is impossible, disking or some other tillage operation should be done in July. Then plow and disk at a later date. The depth of plowing should be 5 to 5 1/2 inches. Experiments show that plowing deeper than 5 1/2 inches does not usually increase the yields.

Planting the Seed:

1. Date to plant in Central and Eastern Nebraska: Where Hessian fly is a problem, plant wheat when the danger of fly damage to wheat is over. This date varies from year to year, but usually ranges from September 20 to October 1. The fly-free date for counties where fly is a problem is announced each year by the College of Agriculture. Consult your county agent for the fly-free date in your county.

Planting before the fly-free date may expose the crop to two hazards: (1) the danger of a Hessian fly infestation and (2) excessive growth of the wheat plants in the fall. The latter is wasteful of soil moisture.

Planting too late results in less fall growth, less fall stooling and root development, poor establishment of the plants in the fall, less certain winter survival, and the possibility of greater heat and rust injury.



2. Date to Plant in Western Nebraska: In Western Nebraska the wheat grower has little trouble with Hessian fly, but he has less choice of planting time because of limited rainfall and the danger of wind erosion on fields during the winter and spring months. Mid-season planting, September 5 to 20, is now considered the best time for planting wheat in Western Nebraska. Information collected from Chase and Banner County tests indicate that even later dates of planting may be desirable.

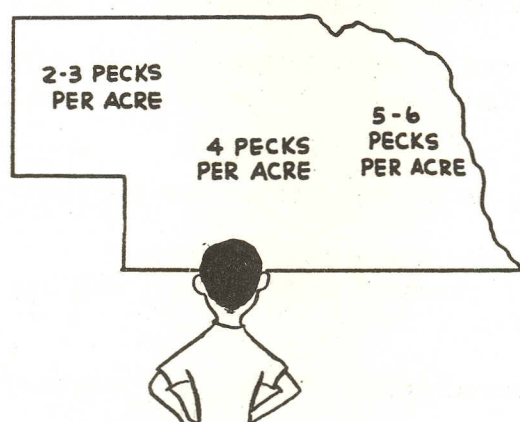
Date of Planting Winter Wheat Test Results

<u>Date of Planting</u>	<u>Yield - Bushels Per Acre</u>	
	<u>Banner Co. 1954 only</u>	<u>Chase Co. 1953-1956</u>
August 15	None	--
August 22	13	--
August 25	--	23
August 29	16	--
September 5	21	29
September 12	24	--
September 15	--	33
September 19	20	--
September 25	30	34
October 5	29	31

Studies made by the Nebraska College of Agriculture show that severe damage from western streak mosaic and root rot disease is more likely to occur in early planted wheat. Excessive fall growth of the crop, with resulting waste of much needed moisture, is also encouraged by early planting.



RULE 4: PLANT SEED AT THE PROPER RATE



Late planting on the other hand may not allow enough time for wheat to cover the ground in the fall. Under these conditions there is (1) less fall stooling and root development and (2) more opportunity for wind erosion during the winter and spring months.

3. Rate of Planting: In Central Nebraska 4 pecks of seed per acre is enough. In Eastern Nebraska the rate is 5 to 6 pecks per acre. These rates should be increased somewhat if the wheat is planted late.

In Western Nebraska, wheat is seeded at the rate of 2 to 3 pecks per acre. The smaller rate is usually used in the extreme western part and becomes heavier as one moves eastward.

PROVIDING SOIL FERTILITY FOR WHEAT

For best yields and quality, wheat needs good soil fertility. This can be provided by

(1) applying manure to the soil, (2) using legumes in the crop rotation, and (3) using commercial fertilizer. To find out whether fertilizer is needed, take soil samples and have them tested by the Soil Testing Service. Ask your county agent or club leader to show you how to take soil samples. Submit the samples at least four weeks before you need to buy the fertilizer.

In Eastern Nebraska wheat on manured land yields 9 bushels more than without manure (12 tons per acre). Wheat in a six-year rotation with two years of red clover or sweetclover yield four bushels more than without the legume, even though the wheat was planted two years after the clover was plowed under.

Soils of Southeastern Nebraska are generally too low in phosphorus for best wheat yields. In this region it usually pays to use phosphate fertilizer when planting wheat on legume ground. On land that has had no legume for two years or more, the wheat yield is usually increased 10 to 12 bushels by applying fertilizers containing both nitrogen and phosphorus.

In regions where summer fallowing is the usual preparation, soils that are black and deep may not need phosphate or nitrogen fertilizer. But where the soil is light colored, eroded, shallow or sandy, it probably needs both phosphate and nitrogen for top quality and high yield. Regardless of what the soil looks like, it is best to have the soil tested. The tests will tell you what fertilizers are needed, how much is needed, when to apply them and how to apply them.



RULE 5: PLANT SEED IN A FERTILE SOIL

TO BE SURE OF THE SOIL'S FERTILITY, TAKE A SOIL SAMPLE, HAVE IT TESTED, & FOLLOW RECOMMENDATIONS.



Nebraska wheat is valued for its high protein percentage and quality. When wheat is grown after a legume in the crop rotation system or on manured land, it usually has a high protein content. The proper use of nitrogen fertilizers usually increases the protein percentage in the grain. These practices are therefore useful in producing high quality as well as high yields.

CONTROLLING WEEDS IN WHEAT

Weeds are a serious competitor for plant nutrients and moisture. They may be controlled by (1) providing a clean seedbed, (2) planting clean seed, (3) keeping field borders clean, and (4) killing weeds by the use of sprays and/or tillage methods.

Provide a Clean Seedbed: Common weeds are not likely to bother wheat, if the seedbed has been properly prepared at the proper time. To keep weeds out of wheat land that has not been summer fallowed, follow these practices:

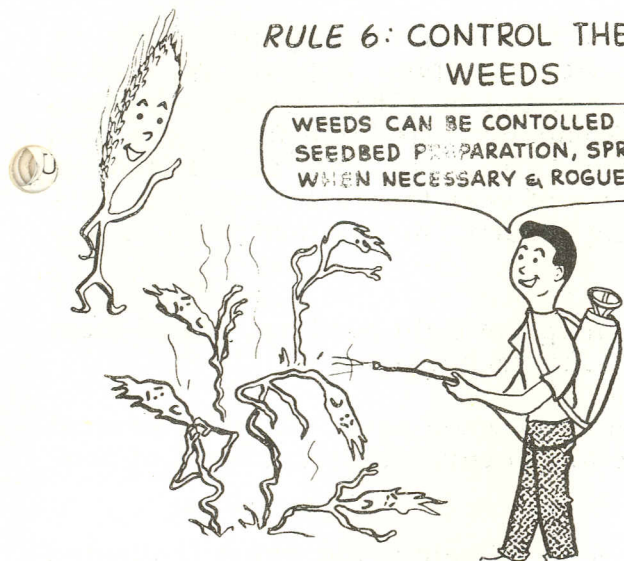
- (1) Start preparing the land for wheat as soon as possible after the previous crop has been harvested.
- (2) Work the ground whenever weeds or volunteer wheat start to grow.
- (3) Disk or harrow the ground shortly before planting so the wheat will have an even start with any weeds that remain in the field.

If timely tillage operations have been performed prior to planting, summer fallowed land is almost free of weeds.

Plant Clean Seed: Planting clean seed is an important step in the control of weeds. It is impossible to control weeds, if they are planted each year with the crop seed.

RULE 6: CONTROL THE WEEDS

WEEDS CAN BE CONTROLLED BY PROPER SEEDBED PREPARATION, SPRAYING WHEN NECESSARY & ROGUEING.



During recent years, drill box seed surveys have been conducted in Nebraska to find out the kind of seed that is being planted. Samples were picked up from drills, wagons, trucks, and trailers in the fields where farmers were actually planting their wheat. These surveys show that some seed wheat is heavily infested with weed seed. In fact, one Central Nebraska county averaged 570 weed seeds per pound of wheat. If a farmer planted such wheat at the rate of six pecks per acre, he would be planting one weed seed per square foot of field area. One sample of seed contained 8,650 weed seeds per pound of grain or more than one-half million per bushel of grain. This farmer was seeding about 20 weed seeds on every square foot of his field.

One of the best ways to be sure of weed-free seed is to plant certified seed. The same drill box survey showed an average of only 1 or 2 weed seeds per pound of certified seed. No noxious weed seeds were present. This means that farmers who use certified seed are planting no noxious weeds and almost no common weeds in their fields.

Keep Field Borders Clean: Fence rows and borders between fields are often the source of weed seeds that infest crops. If possible, plant field borders and fence rows to perennial grasses such as brome, intermediate wheat, crested wheat, or other adapted varieties. Grasses help keep weeds under control. The removal of useless fences so that weeds can be more easily destroyed is helpful.

Spray fence rows and field borders with 2,4-D to control broadleaf weeds. Be sure to spray early in the season when the weeds are small.

Control Troublesome Stands of Broadleaf Weeds in the Wheat: When wheat stands are poor because of dry weather, insects, blowing, or freezing, broadleaf weeds may become a problem. Some of the more troublesome weeds are sunflowers, fireweed (kochia), hemp, ragweed, and pigweed. If these weeds become numerous, destroy them by spraying with 2,4-D. If properly used, this chemical will kill these weeds without injuring the wheat. Some pointers to remember when using 2,4-D in wheat are:

- (1) Do not spray the same fall the wheat is planted.
- (2) Do not spray when the wheat is in the early boot or early heading (flowering) stages.
- (3) Spray when weeds are young and are growing rapidly. They are easily killed at this stage of growth. One-half pound of amine (1 pint of 40 per cent material) will generally do an excellent job, if applied during favorable conditions. One-fourth pound of ester (1/2 to 3/4 pint of most of the ester forms that are commonly available) will also, do an excellent job, if applied during favorable conditions.
- (4) If it is hot and dry, cold, or the weeds are tough and woody, it may be necessary to use twice the amount of chemical required under favorable conditions.

For additional information, see Extension Circular 198, "2,4-D For Weed Control in Field Crops."

Special Weed Control Problems:

1. Downy Brome and Hairy Chess (Wild Bromes): Downy Brome and Hairy Chess are a major weed problem in wheat in some parts of the state. They are more difficult to control than most weeds, because their growth habits are like those of wheat. These weed grasses germinate in the fall, live through the winter, and start growing early in the spring. There are no chemicals that will remove downy brome or hairy chess from winter wheat without also damaging the wheat crop.

If these weeds become a major problem, substitute a row crop of sorghum, corn, or safflower for wheat in one year of the crop rotation. For example: Suppose the land is seeded to wheat in the fall of 1957. The wheat will be harvested in 1958. Corn, sorghum, or safflower could then be planted in the spring of 1959 and harvested that fall. The land would then be summer fallowed and planted to wheat in 1960. The crop substituted for wheat in this program makes its growth at a different time of year than wild bromes. This fact, plus cultivation of the row crop during the growing season, makes control of downy brome and hairy chess much easier.

In any wild brome control program, be sure to clean up the field borders. Seed them to perennial grasses or treat with TCA, Dalapon, or a similar grassy-weed killer.

2. Field Bindweed: Field bindweed is another serious weed pest. It takes several years of work to bring this weed under control. There are several different ways of controlling bindweed which are:

- (1) Spray bindweed patches with 2, 4-D. Spray the seedbed before the wheat is planted in the fall or spray the growing wheat in the spring.
- (2) Deep plow bindweed infested areas immediately after the wheat is harvested. Then cultivate with a duckfoot machine each time the plants reach a height of 6 to 8 inches. Cultivate with a duckfoot throughout the summer and until seeding time in the fall. Delay seeding until about October 1.
- (3) Deep plow immediately after harvest. Then cultivate with the duckfoot until the latter part of August. Then discontinue the duckfoot tillage program and allow the bindweed to grow until about September 25. At that time, spray with 2, 4-D and seed the wheat about October 1.

CONTROLLING DISEASES OF WHEAT

Diseases of wheat most likely to be found in Nebraska are loose smut, bunt or covered smut, leaf rust, stem rust, mosaic, and root rot.

Loose smut: Loose smut is a fungus disease that shows up clearly at heading time. Plants affected with the disease have heads that are dark colored masses of powdery material which are smut spores. These spores soon blow away, leaving naked stems in place of heads.

Since the loose smut infection is carried inside of the wheat kernel, chemical treatments applied to the surface of the seed will not control it. The most practical control for this disease is the purchase of disease-free seed. Certified seed is recommended. Pawnee is a resistant variety.

Bunt: Bunt, also known as covered or stinking smut, is another fungus disease. Both the yield and market value of wheat can be reduced by this disease. Bunt usually is not noticed until harvest time. The infected heads contain balls of smut instead of grain. These balls of smut resemble kernels of wheat in size; and are made up of foul smelling powder or fungus spores. The spores are mixed with the grain during the threshing process. Thus, sound kernels carry the disease.

Since bunt spores live on the outside of the wheat kernel, they can be killed by chemicals applied to the seed before planting. Treat the seed with Ceresan M, Panogen, or some other recommended chemical. Ceresan M, in the dust form, can be applied at home at the rate of 1/2 ounce per bushel of seed. Panogen is a liquid and must be applied with special seed treating equipment.

RULE 7: CONTROL DISEASES

To Control Diseases:

1. SELECT DISEASE-FREE SEED
2. TREAT SEED BEFORE PLANTING
3. PLANT DISEASE RESISTANT VARIETIES
4. AVOID EARLY PLANTING



Some wheat varieties such as Nebred, Bison, and Comanche are resistant to bunt.

Rusts: There are two kinds of rusts, stem rust and leaf rust. Both rusts can attack the stems and leaves of the wheat plant. Both kinds cause small reddish spots or streaks. This reddish dust which is rust spores will rub off on the fingers or clothes.

When wheat plants become heavily infected with rust, the plants tend to dry up and produce only small yields of light, shriveled grain. Both stem and leaf rust spores turn into a black dormant stage as the grain reaches maturity.

- (a) Leaf rust, also known as orange leaf rust, appears on the leaves and stems in circular, powdery masses of bright orange-colored spores. If the infection is heavy, the leaves may die. When attacks occur early in the season, the yield will usually be reduced and the test weight of the grain may be lowered.
- (b) Stem rust, also known as black stem rust, first appears in dark red elongated masses of powdery spores; mainly on the stems. In a few days the stems may have a roughened, split or broken appearance. The disease soon reaches the black spore stage. At this stage the disease is in a dormant or resting period. Severe outbreaks of stem rust cause badly shriveled kernels and greatly reduced yields.

If they are available for the locality, planting adapted rust resistant varieties is the best means of preventing rust. Pawnee is partially resistant to leaf rust and slightly resistant to stem rust. Nebred has some tolerance for this disease but is not resistant. Earlier maturing varieties often escape rust injury to a greater extent than late maturing varieties. This is because stem rust usually develops late in the season.

Mosaic: Mosaic is a virus disease that is spread by a tiny mite that feeds on volunteer wheat. The disease causes the plant to become stunted and have yellowish streaking of the leaves. The streaks usually run parallel to the leaf blade. Both tall and short stems may be produced with many of the heads being blank or containing only poor quality, shriveled kernels.

The critical time for mosaic infection is in the fall. However, the symptoms are not usually noticed until warm weather comes in the spring. To control mosaic, avoid early planting and destroy early crops of nearby volunteer wheat at least two weeks before planting.

Root Rot: Root rot shows up in the form of a brownish decay of the roots and crowns of the wheat plant. Like mosaic, it causes stunting, irregularity in height, and gradual drying up of the plant. Early planting encourages root rot. For this reason, avoid early planting.

CONTROLLING INSECT PESTS OF WHEAT

Nebraska crops are subject to serious losses each year from a great many different insects. Yearly losses of yield from insects may be minor or extensive. A few of the more common insects that attack Nebraska wheat are Hessian Fly, Armyworm, Army Cutworm, Pale Western Cutworm, True Wireworm, False Wireworm, White Grubs, Greenbugs, Wheat Curl Mite, Brown Mite, and Grasshoppers.

Hessian Fly: The adult fly is a tiny dark colored (black or deep dark brown) fly that lives only a few days. During this time it lays eggs on young leaves of wheat plants. Tiny worms, known as larvae, hatch from the eggs and make their way to the junction of the leaves and stem. Here the larvae feed for several days. Then they turn into the pupa which is commonly referred to as the flaxseed stage. During the flaxseed stage the larvae turn into a fly. Several generations may occur during a favorable year. The summer and winter are usually spent in the flaxseed stage.

Injury from this insect is caused entirely by the larvae as they feed on the lower parts of the wheat stem. Infected stems usually break over just before harvest. Yield losses are in proportion to the number of broken stems.

RULE 8: CONTROL FIELD INSECTS



Control by using varieties of wheat that are resistant to the insect and by planting wheat after the fly-free date. Your county agent or the Agricultural Experiment Station can tell you when the fly-free date is.

Armyworm and Army Cutworm: The army cutworm is dark colored and maybe 1 1/2 inches in length. It usually hides during the day under the surface of the soil or under debris in the field. Cutworms usually appear in March and early April. They cut off wheat plants at the soil line or feed on the leaves. Feeding usually occurs at night or on dark cloudy days. Later they turn into moths.

Armyworms are climbing cutworms that may attack wheat about the time it is heading. They generally appear later in the season than army cutworms; and feed both day and night. When heavy infestations occur, they are usually found in rank or lodged grain.

Control the army cutworm and the armyworm by spraying with insecticides or using poison baits as recommended by your county agent.

Pale Western Cutworm: This cutworm is light gray colored. It feeds underground, and cuts off wheat plants during the spring months. It occurs in the western counties of Nebraska, usually during April and May. In sufficient numbers, it may destroy entire fields of growing wheat in a few days.

Spraying with a recommended insecticide will control pale western cutworms. They are more difficult to control than other insects, because of their habit of feeding below the soil surface.

True and False Wireworms: True wireworms are the larvae of click beetles. The wireworms are usually hard, dark brown, smooth wire-like worms, varying from 1/2 to 1 1/2 inches in length. They may attack germinating seed, but their greatest damage is to the roots and underground portions of the stems.

False wireworms are also the larvae of a beetle. These adult beetles can not fly, and are commonly observed crawling about on the soil surface. When molested, the beetle will often stand on his head. The false wireworm larvae, which resemble true wireworms, cause injury in the fall by feeding on the roots of fall seeded wheat. They are more numerous during dry years.

False wireworms can be controlled with seed treatments of several insecticides. True wireworms are more difficult to control. Soil applications of insecticides are effective but expensive.

White Grubs: White grubs injure wheat by feeding on the roots. Injury may occur in the spring or fall and can be identified by wilted and dead plants. Grubs may be found near the roots of infected wheat.

Soil insecticides and insecticides mixed with the seed in the drill at planting are methods of control.

Greenbugs: Greenbugs are species of small plant life or aphids. They are bright green with black tipped legs and black cornicles (body tubes on the back). The eyes and feelers are also dark colored. They feed on the upper side of the leaves, behind the boot, and on the stem. Damage generally occurs in the spring and is caused by the sucking of plant juices by the insects.

Control with a contact spray recommended by your county agent.

Wheat Curl Mite: These insects are microscopic, slender, white mites with only four legs. Leaves infected with white mites curl at the edges and fold. Tips of some leaves are trapped by the lower leaves -- causing the trapped leaf to loop.

The mites do not cause serious damage to the plant, but they transmit a serious virus called wheat streak mosaic.

There is no practical control for the mites, because they feed on volunteer wheat and other grasses and are easily carried from field to field by the wind. Mite populations can be held down by destroying early stands of volunteer wheat. Delayed planting of wheat reduces the chances of mosaic infection.

Brown Mite: Brown mites sometimes cause damage to wheat in Western Nebraska. This mite can be easily seen with the naked eye. Brown mites damage the wheat by sucking plant juices from the leaves. The plants then dry up as if they were injured by drought.

Control usually is not necessary. If heavy infestations threaten, a contact spray must be used.

Grasshoppers: Several kinds of grasshoppers may cause severe damage to wheat in the fall and early summer. They feed on leaves and if numerous, they may cut off heads of wheat.

Grasshoppers can be controlled with several insecticides and poison baits.

MAINTAINING SEED SUPPLIES

Seed surveys show that more than 75 per cent of the farmers plant seed wheat that is grown on their own farm. Twenty-three per cent purchase seed wheat from their neighbors. In other words, about 97 per cent of the wheat seed is raised in the local neighborhood. This points out the importance of maintaining a supply of good seed on every farm.

Improving the Quality of Seed: Whether the grower is trying to improve the quality of common seed or produce certified seed, the following precautions will be helpful:

- (1) Avoid mixing grains or varieties by thoroughly cleaning the combine, bins, and wagon or truck before harvest starts. If more than one variety of wheat is grown on the farm, clean the combine, truck, or wagon again before harvesting of the second variety begins. Be sure to clean out grain in your shoes, pant cuffs, and pockets so it will not unknowingly be scattered and mixed with a pure variety.
- (2) Have seed wheat checked for purity. Common seed wheat can be checked for purity by submitting a sample to the Nebraska Grain Improvement Association, College of Agriculture, Lincoln, Nebraska. This service is offered in most of the wheat producing counties.
- (3) Set aside a seed production field. The quality of common wheat can be improved by setting aside a small field, or a part of a larger area, as a seed production field. Avoid mixtures of volunteer wheat by selecting a field that did not grow wheat the previous year. Plant pure seed on a clean seedbed.
- (4) Practice rogueing. This means removing by hand rye plants or off-type or diseased wheat plants that may be found. Rye heads several days earlier than wheat and grows taller. This makes it easy to see. Carry rye plants out of the wheat field and destroy them. If the plants are dropped on the ground where they are pulled, seed of immature rye plants may produce a volunteer growth. Make a final check after the wheat heads and just before harvest. Remove rye that may have been missed during the previous inspection and wheat plants that are different in height, color, or kind of head.
- (5) Harvest and store the grain from the seed production field separately.

- (6) Plant certified seed occasionally -- at least once every five years.

Producing Certified Seed: The certification of crop seed corresponds in a general way to the registration of livestock. When a new crop variety is developed by the Agricultural Experiment Station, the Nebraska Seed Certification program provides a way by which the purity and quality of the seed can be assured year after year. Under this system the original seed of a variety is distributed only to farmers who agree to produce seed under the rules and regulations provided by the state certification program.

The rules of certification require that the crop be grown and handled in such a way that it will be kept free from mixtures, noxious weeds, and other objectionable weed seeds. The seed must meet high standards of purity and germination. A record of each crop of certified seed is maintained by the Nebraska Crop Improvement Association, College of Agriculture, Lincoln, Nebraska.

All farmers are eligible to produce certified seed for their own use or for sale.

Following are the general requirements for growing certified seed in Nebraska:

1. Eligible Varieties: Choose a variety eligible for certification in Nebraska. Check with your county agent to find out which varieties are recommended for your locality. Recommended varieties are eligible for certification.

2. Land Requirements: The seed must not be planted on land that was in wheat the previous season except in those cases where the previous crop was certified and of the same variety.

3. Seed: The wheat planted must be either certified seed or foundation seed in order to be eligible for re-certification.

4. Field Inspection: Field inspections are made by representatives of the Nebraska Crop Improvement Association. The inspections are made after the wheat is fully headed, but before harvest.

5. Field Standards:

(a) A field cannot be divided for the purpose of certification. Definite field boundaries such as permanent fences or five foot strips of ground planted to another crop must be established.

(b) Isolation -- Since wheat is self-pollinated, it does not need to be isolated from other wheat varieties or crops except by the permanent field boundaries.

(c) Field Inspection Requirements-- To be eligible for certification at the time of field inspection, winter wheat must not contain more than the following:

(1) 2 per cent loose smut or 0.1 per cent covered smut or a combined total of 2 per cent smut

(2) one head of rye per each two acres

(3) one head of winter barley per each acre

(4) 1000 heads of spring small grain per acre

(5) 100 heads of other winter wheat varieties per acre

(6) no noxious weeds (field bindweed, hoary cress, leafy spurge, Russian knapweed, and Canada thistle)

Any field may be turned down because of serious diseases other than smut or because of too many weeds.

6. Laboratory Standards: After the crop is harvested and the winter wheat is submitted to the laboratory for analyses, it must meet the following standards:

(a) 97 per cent pure seed

(b) not more than 10 kernels of other winter wheat varieties per pound

(c) not more than 20 kernels of spring grain per pound

(d) free of rye

(e) not more than 1 kernel of other winter crops per pound

(f) a total of only ten weed seeds or less per pound with (1) no noxious weed seeds and (2) no more than one secondary noxious weed seed (mustard, dock, penny-cress, quackgrass, horse nettle, and dodder)

- (g) at least 85 per cent of the seeds must germinate
- (h) a test weight of at least 54 pounds

HARVESTING, DRYING, AND STORING

Harvesting, drying, and storing of wheat should be considered together. Each operation is dependent to some extent upon the other.

Through the years man has been trying to make these operations independent of nature by applying mechanical or chemical means. Mechanical drying of wheat that has been harvested with a high moisture content is a step by the farmer to be less dependent upon the weather; and thus to reap a larger harvest of high-quality grain. In this chapter each of the processes will be discussed separately.

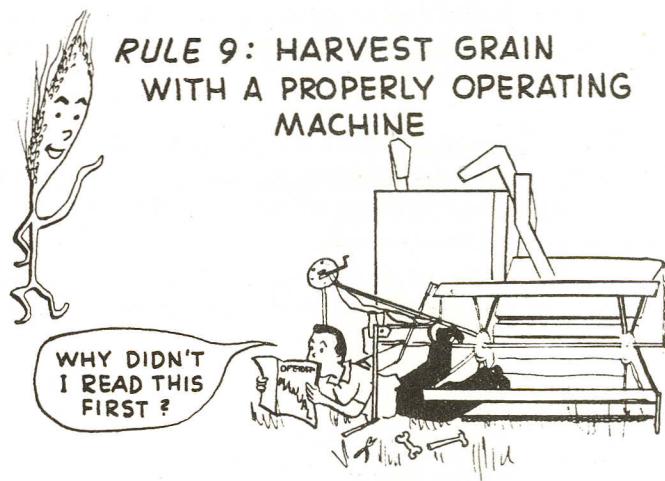
Harvesting:

1. Time to Harvest: The time to harvest wheat by various methods is shown below:
 - (a) Combine for direct storage of grain when the grain contains 13 per cent moisture or less; 7 to 10 days after binder-ripe date.
 - (b) Combine for artificial drying of grain before storage when grain contains 20 per cent moisture or less.
 - (c) Bind and thresh when the grain is mature; may still contain 25 to 30 per cent moisture

The only satisfactory way to find the moisture content of grain is to test it with a moisture tester. Your elevator operator will be glad to test a sample of grain for you.

2. Preparation of Machinery for Harvest: The machine should be examined well ahead of harvest season. Replace worn or broken parts. Check adjustment of all working parts of the machine. The "Operator's Manual" gives the recommended settings of machine parts. If you do not have an "Operator's Manual," your dealer will furnish one.

3. Machine Operation: How well a machine operates is a direct result of the skill of the operator. The operator should know how and why each part of a machine works. The "Operator's Manual" and USDA Farmers' Bulletin 1761, "Harvesting With Combines," has a section on troubles and remedies. They also suggest how to locate the cause of trouble when the machine is not working properly.



Examine the field before cutting to determine field losses resulting from crop variety, insects, diseases, or other causes. After harvest starts, check the ground behind the machine and determine machine losses. The losses are determined by counting the kernels of wheat per square foot and dividing by 19. (18 to 20 kernels of wheat per square foot equal 1 bushel per acre loss). Well-adjusted combines have operated at 98 per cent efficiency.

Thoroughly clean the machine before changing fields or variety of crop harvested. Such a practice prevents the mixing of crop varieties and the spread of weeds.

Observe all safety rules.

Mechanical Drying:

Mechanical drying should become a part of your regular crop management program. Controlled drying fits in with modern production, harvesting, and handling methods.

By using drying equipment you can (1) store wheat safely, (2) market wheat without a moisture discount, (3) harvest wheat as soon as it is mature, (4) harvest wheat early in the morning and late at night, and (5) harvest wheat in wet harvesting weather or with weed growth.

Two methods of drying are (1) with natural or unheated forced air and (2) with heated forced air. These two methods require different equipment and methods. Following are some comparative features:

Natural Air

- (a) Low initial equipment cost
- (b) Long drying time
- (c) Capacity based upon available electric horse power
- (d) No effect upon rate of harvest
- (e) No fire hazard
- (f) No additional grain handling equipment required
- (g) Grain is dried in storage
- (h) Deep storage bins not suitable
- (i) Can be used for aeration of grain
- (j) Little supervision required

Heated Air

- (a) High initial equipment cost
- (b) Short drying time
- (c) Capacity based upon size of burned and batch container
- (d) Rate of harvest based upon capacity of dryer
- (e) Some fire hazard
- (f) May require additional grain handling equipment
- (g) Grain must be moved to storage after drying
- (h) Storage structure not a part of drying system
- (i) Separate aeration system required
- (j) Considerable supervision required

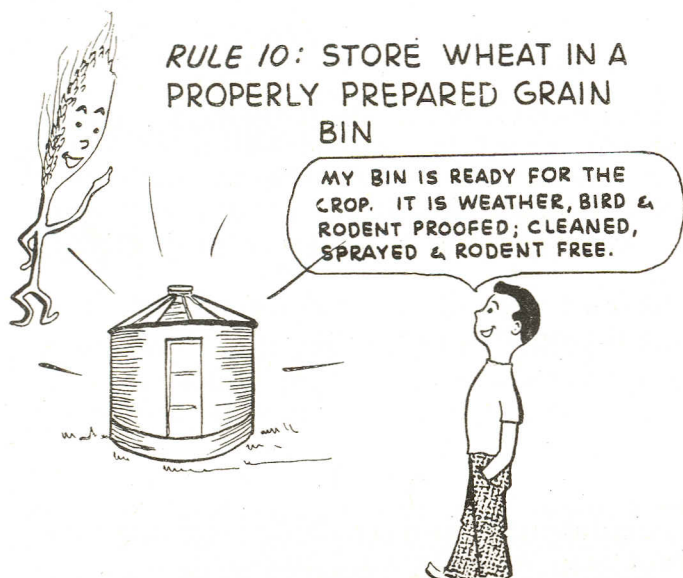
Under Nebraska conditions and proper management, either system will accomplish a good drying job. The system for your farm will depend upon your farm conditions and requirements.

You may be interested in knowing how much water must be removed from wheat for safe storage. The following table gives the weight of water to be removed by subtracting the final weight of water after drying from the weight of water before drying. To change to gallons, divide by 8.3.

Pounds of Water Per Bushel of Wheat at Different Moisture Content Percentages

35% . . . 27.8 lbs.	24% . . . 16.4 lbs.	16% . . . 9.8 lbs.
30% . . . 22.1 lbs.	22% . . . 14.6 lbs.	14% . . . 8.4 lbs.
28% . . . 20.1 lbs.	20% . . . 12.9 lbs.	12% . . . 7.0 lbs.
26% . . . 18.2 lbs.	18% . . . 11.4 lbs.	10% . . . 5.8 lbs.

RULE 10: STORE WHEAT IN A PROPERLY PREPARED GRAIN BIN



Storing The Grain:

1. Wheat Must Have A Low Moisture Content: Grain can be stored safely for long periods of time only when it has a moisture content of 13 per cent or less. Excessive moisture will cause souring, heating, or molding; and will promote insect infestation.

Even in dry wheat there is a tendency, in the colder climates and in the larger bins, for moisture to build up in the upper layers of the grain during the fall and winter. This can be prevented by aerating the grain with small pressure fans or with a natural air drying system.

The moisture build-up results from the wide differences in temperature of the grain in various parts of the bin. These differences in temperature cause air currents that carry water vapor from the warm bin center to the cooler areas. Generally, the warmer air moves upward and when it meets the cooler upper layers of grain, moisture is deposited. Unless this moisture build-up is prevented, the grain will mold and cake.

2. Wheat Must Be Protected from Stored Grain Insects and Pests: Insects that attack stored grain take a bigger "cut" out of Nebraska farm income than do most insects that attack crops in the field. Most of the damage to stored grain can be prevented by providing a good tight storage bin that has been thoroughly cleaned and sprayed with a long-lasting insecticide. Spray two or three weeks before filling; and be sure to spray the area surrounding the bin.

DDT, methoxychlor, or activated pyrethrum sprays are recommended. Use a 2 1/2 per cent solution of either product. Apply at the rate of 2 gallons for each 1000 square feet of area. Pyrethrum powders and sprays are also available for mixing with stored wheat to protect it from stored grain insects.

Storage bins should be protected to keep out rats, mice, chickens, birds, cats, and other animals. Rodents and birds that get into grain cause enormous losses. They waste the nation's food supply and eat away the farmer's profits. They contaminate grain that is to be used for food. You are urged to take part in the nation-wide clean grain program by undertaking a year round rodent control program.

Check stored grain at frequent intervals to make certain that it is not going out of "condition." The best way to check stored grain is to take samples with a grain probe at several locations in the bin. This permits careful checking to determine the condition of grain, or the presence of stored grain insects at various levels in the bin. If stored grain insects are present, fumigate the grain. If heating occurs, move the grain or put the air drying system into operation.

Grain Storage Structures:

Proper grain storage structures require the consideration of eight different factors which are (1) materials, (2) location, (3) strength, (4) weathertight, (5) moisture proof floors, (6) convenience to fill and empty, (7) convenience to inspect, fumigate, and clean, and (8) rodent and bird proof.

1. Materials: There is a wide variety of materials that can be used to construct storage structures. These include steel, lumber, plywood, waterproof wallboard, asphaltic roofing and siding, aluminum, concrete, and building tile. Each material must be used with proper regard for its ability to withstand stress and keep out moisture.

2. Location: The wheat storage structure should be located 100 feet or more from other buildings for fire protection. It should also be located on a site that is well drained, free from surface water, and not subject to flooding.

3. Strength: Wheat storage structures must be tighter and stronger than most farm buildings. This is because it must withstand the grain pressure against the walls and supports, and the weight on the floor and foundation. Failures from poor construction result in loss of grain and costly repairs.

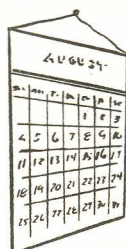
4. Weathertight: All grain storage structures should be weathertight. Rain or snow entering through walls and the roof can cause heavy damage to stored grain. All door and hatch openings should be weathertight. Special attention should be given to cracks and



knotholes in wood construction and to open bolt holes and loose bolts in metal construction. Metal-backed, black neoprene washers should be used under all bolt heads in metal bins.



RULE 12: CHECK THE STORED GRAIN REGULARLY FOR INSECTS, RODENTS & MOISTURE



GUESS IT IS TIME TO CHECK THE WHEAT TO BE SURE IT IS FREE OF INSECTS, RODENTS, & EXCESS MOISTURE.



5. **Moisture Proof Floors:** Provide protection against the movement of moisture from the ground through the floor of the bin and into the grain. Concrete floors, when properly constructed with moisture barriers, are very satisfactory. Floors that are supported above ground, such as are usually found with frame constructions, are relatively free from hazard of ground moisture.

6. **Convenience to Fill and Empty:** The right size and type of openings for filling and emptying the storage structure will depend on the type of filling and emptying equipment used. A roof hatch is satisfactory for some types of portable elevators, if the building is not too high. The main duct of the drying system is frequently used in connection with an auger or elevator to help empty the bin.

7. **Convenience to Inspect, Fumigate, and Clean:** The design of the storage structure should permit inspection, sampling, and fumigation of the grain in storage. Grain can be sampled with a deep grain probe, if the grain is not more than 16 feet deep and there is 2 to 4 feet of head space above the grain. Cleaning and spraying is relatively easy, if the number of places where grain can lodge while emptying is kept to a minimum. Fumigation may be necessary, so make arrangements for temporary sealing of all openings.

8. **Rodent and Bird Proof:** To reduce damage from rats and mice, the storage structure with a wooden floor should have an open foundation. The floor should be 12 to 18 inches above the ground. Birds can be kept out of bins by screening the ventilators and other openings.

MARKETING THE WINTER WHEAT CROP

Marketing of wheat differs from the marketing processes of other grain, because wheat is used primarily for human food and the other grain crops are used primarily for livestock feeds. Flour mills are the biggest buyers and processors of wheat. They are quite particular about the quality of wheat they buy.

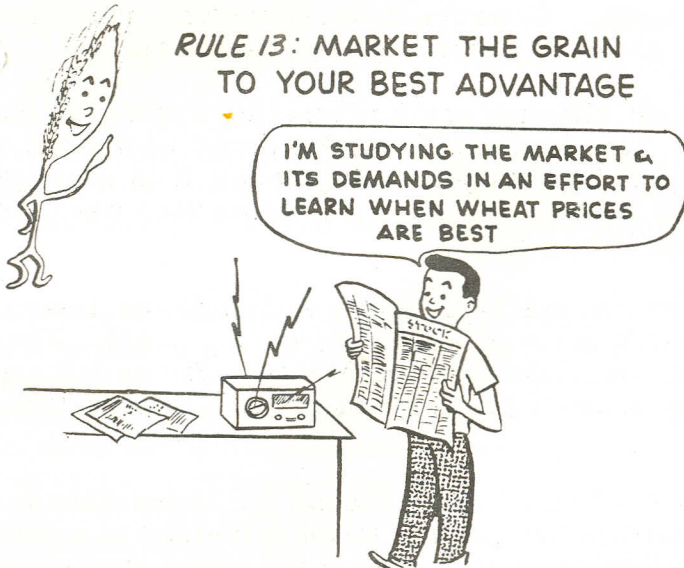
Classes of Wheat: There are seven classes of wheat established by the U. S. Department of Agriculture grain grading standards. Each of these classes has certain quality characteristics that cause it to be suited to certain uses. The seven classes of wheat and the principal use for each is shown below.

<u>Market Class</u>	<u>Principally Suited For</u>
I Hard Red Spring Wheat	Bread
II Durum Wheat	Macaroni and Spaghetti
III Red Durum Wheat	Poultry, Livestock and Dog Food
IV Hard Red Winter Wheat	Bread
V Soft Red Winter Wheat	Cake, Cookies, Biscuits, and Crackers
VI White Wheat	Pasteries and Breakfast Foods
VII Mixed Wheat	Poultry, Livestock, and Dog Food

Nebraska produces hard red winter and hard red spring wheat. For this reason, Nebraska is a bread wheat producing state. Production of any other class of wheat is considered undesirable in this state.

Grain Grading: The class of wheat is not the only thing that those who handle and store wheat must consider. The wheat in each class is graded according to standards set up by the U.S. Department of Agriculture. The characteristics that determine the grade of the grain are dryness, purity of type, weight per bushel, plumpness, cleanliness, soundness, and general "condition."

**RULE 13: MARKET THE GRAIN
TO YOUR BEST ADVANTAGE**



"Condition" is a general term that refers to whether the grain is in good keeping quality or poor keeping quality. Grain that goes out of condition usually heats and may become musty or sour. Condition is also indicated by words such as "smutty," "garlicky," "weevily," "bright," "stained," "tough," and "treated." These terms describe various conditions in which grain is sometimes found; and if applicable, may be added to the grade designation.

The six grades are No. 1, No. 2, No. 3, No. 4, No. 5, and Sample. Sample grade is the lowest. No. 2 and No. 1 are the grades

most desired for milling and making breakfast cereals. The grade of the wheat, as well as the class, determines the price.

When the grain is delivered to the local elevator, it is inspected and graded by the dealer. At terminal grain markets the grades are determined by an official inspector who is licensed under a law called the grain Standards Act. This act provides that all grain must be officially inspected and graded before it is sold by grade, if shipped from one state to another or to foreign countries.

Buying and selling grain by grade makes it possible for buyers and sellers to know the quality of grain without having actual samples of the grain in their possession. Grading also makes it possible to store grain of like quality together in large terminal elevators without danger of lowering the value of high-quality grain by mixing it with grain of lower quality.

Wheat Quality As It Affects the Market: Since Nebraska is in the hard red winter wheat region, this discussion on marketing will apply to this class of wheat. About 80 per cent of the hard red winter wheat is milled into flour that goes into the production of bakers' flour. Bakers' flour is a flour that must meet the rigid specifications required by today's assembly-line production of bakers' bread. The remaining 20 per cent is sold as family flour; flour that is designated for home use. Bakers' flour is not made from any one single variety from any one locality. It is made by blending wheats of varying characteristics in order to end up with a flour that meets an individual baker's specifications.

One of the important characteristics of good bakers' flour is its gluten quality. Gluten is the substance in wheat flour that gives it the strength or ability to hold together, stretch, and retain gas while the germinating dough expands or "rises." Some varieties, such as Cheyenne and Nebred, have "strong" gluten. Dough made from Nebred and Cheyenne flour is elastic and has the ability to withstand long mixing in mechanical equipment. Other varieties, such as Pawnee and Sioux have medium strong or mellow gluten. These varieties make excellent family type flour. But when used alone they lack the strength needed for bakers' flour.

Most of the wheat produced in the hard red winter wheat region has mellow or medium strength gluten quality. For this reason, there is an abundance of this type of wheat. On the other hand, there is a shortage in production of varieties having strong gluten quality. This situation has resulted in increased demand and premium prices for strong gluten wheats; especially those of high protein content.

Western Nebraska has earned an enviable reputation in grain marketing channels, because it represents the only sizable area in the hard red winter wheat region that raises the strong-gluten wheats almost exclusively. Nebred and Cheyenne varieties account for about 80 per cent of all the wheat grown in this area. Growers in Western Nebraska find it profitable under present market conditions to grow only strong gluten varieties.

Grain Marketing Systems: The finest and most efficient grain marketing system in the world has been developed in the United States. The grain is first delivered to the local elevator. There the farmer may sell it or place it in storage. If he places it in storage, he may ask the dealer to send it on to a terminal market for storage, or he may have the grain remain as his property until he directs that it be sold.

In addition to huge storage facilities at the terminal markets, grain exchanges or boards of trade have been established. These exchanges do not buy, sell, or own any grain. They provide the meeting place for buyers and sellers. Here the grain commission firms buy and sell grains that are consigned to them. They buy and sell the grain based on samples of the grain offered for sale.

Grain is bought and sold at the exchanges for (1) "cash" which means for immediate delivery to the buyer or as (2) "future" which means that the grain is to be delivered at a certain time in the future. Through this system, buyers from any place in the world may place orders for immediate or future delivery. Some grain markets, such as the Omaha Grain Exchange, maintain facilities for cash-grain handling only. Others, such as Chicago, Kansas City, and Minneapolis, have facilities for both cash and future trading. These markets, though complex, are efficient and maintain a constant market for the producer. The grain may be bought and sold many times without actual delivery taking place between buyers and sellers.

SOME SUGGESTED ACTIVITIES

Group activities, in which the entire club takes part and in which parents might participate, can be included in the club program. Such activities help to build interest, enthusiasm, and cooperation. A tour of one of the facilities for grain marketing (local elevator, terminal elevator or grain exchange) or a similar trip should be included in the club program. This should be well-planned in advance in order to get the greatest benefit from the tour. Usually these facilities will welcome visits by 4-H clubs, but they appreciate advance notice and planning.

Some crops judging and demonstration work is required of each club. Numerous grain judging contests and demonstration contests are held in county, regional, and state fairs, as well as state-wide grain shows.

Club members can exhibit samples of their grain at county, regional, and state fairs and other grain shows. The club member should take pride in his grain and enter an exhibit at one or more of the fairs and grain shows during the year.

Following are some suggested activities that you may like to do. If you have other ideas, use them.

Tours:

1. Visit a farm with grain drying facilities.
2. Observe plant characteristics, estimate yields, and check the results of grain fields nearing maturity.
3. Visit a terminal elevator and facilities.
4. Tour local elevators.
5. Visit a terminal grain market and grain exchange.
6. Visit a grain processing plant (feed and flour mills, breakfast food plant, seed processing plant, etc).
7. Visit a local bakery.
8. Visit points where federal inspection of grain in railroad cars is made.

9. Visit the nearest Agricultural Experiment Station.
10. Tour club members projects.
11. Visit a wheat variety demonstration plot.

Demonstrations:

1. Cleaning seed.
2. Treating seed.
3. Making a moisture test.
4. Taking a soil sample for a soil test.
5. Controlling weevil and other stored grain insects.
6. Keeping grain free of rodent contamination.
7. Adjustment of machines for planting.
8. Grading wheat.
9. Spraying weeds or controlling weeds with 2, 4-D
10. Opening a sack of seed.

Judging and Identification:

1. Practice judging samples of grain.
2. Practice judging land.
3. Practice judging fertilizer.
4. Take part in crops and land judging contests.
5. Try to identify different samples of wheat seeds as to varieties.
6. Try to identify different varieties of wheat plants.
7. Try to identify different samples of crops (seeds and/or plants).
8. Try to identify different weeds (seeds and/or plants).
9. Try to identify different insects and plant diseases (may use live specimens, mounted specimens, or pictures).
10. Take part in identification contests.

Other Activities and Studies:

1. Trace a carload of grain.
2. Learn how grain is financed as it moves through market channels.
3. Find out the use of "futures."
4. Discover the purpose and operation of terminal grain markets -- cash and futures.
5. Chart market price trends of a member's crop project for the period of the project.
6. Make a report on grain marketing in a radio interview or talk.
7. Give a demonstration on TV
8. Take part in seed grading and variety identification schools and contests.
9. Inspect grain storage buildings on your farm. Correct conditions for the storing of high quality grain.
10. Check a wheat field for field losses.
11. Check a harvesting machine for broken or worn parts.
12. Check combine losses in the field.
13. Prepare and display a collection of recommended crop varieties and/or weed mounts.
14. Take part in public meetings pertaining to crop production and/or production of high quality grain.

Group Activities at Club Meetings:

1. Show and see slides, slide films, and movies on grain production and marketing.
2. Give a panel discussion, play, or other presentation that stresses grain marketing.
3. Prepare a report on participation by the club and its members in marketing grain from 4-H projects.
4. Invite representatives from different types of grain marketing enterprises to talk at 4-H club meetings. This includes someone from a farmers cooperative marketing organization.
5. Sponsor a wheat variety demonstration plot.

6. Conduct a field loss survey. Eighteen to twenty kernels per square foot equals one bushel per acre. Survey can be made before and after harvest.
7. Inspect a new farm or other grain storages built in your community.
8. Obtain a set of midwest grain storage plans from your county agent. Discuss these at a club meeting. Note different types of construction.
9. Check a harvesting machine for broken or worn parts and for safety hazards.

WHERE TO GET MORE INFORMATION

The information in this manual is by no means complete. 4-H members and leaders who want more detailed information producing, harvesting, storing, and marketing of wheat are referred to the following sources:

A. Selecting Varieties and Growing The Crop

Fall Grain Varieties For Nebraska -- Extension Circular 55-102

Recommended Crop Varieties for Nebraska -- CC 130

Growing The Winter Wheat Crop -- SB 389

Nebraska Varietal Tests of Fall-Sown Small Grains -- Outstate Testing Circular, Published each year by the Nebraska Agricultural Experiment Station.

Varieties of Hard Red Winter Wheat in the United States -- USDA Circular 938

B. Seed Treatments

Treat All Seed of Cereal Grains Before Planting -- EC 1807

The Hows and Whys of Cereal Seed Treatment -- EC 1809

C. Seedbed Preparation -- Summer Fallow

Stubble Mulch Farming -- EC 171

Stubble Mulch Wheat Farming Methods for Fallow Areas -- EC 54-100

Stop Wind Erosion -- EC 55-107

D. Fertilizers

Commercial Fertilizer Results with Winter Wheat and Rye -- Outstate Testing Circular, Published each year by the Nebraska Agricultural Experiment Station

General Fertilizer Recommendations For Eastern Nebraska -- CC 105

General Fertilizer Recommendations For Central Nebraska -- CC 106

General Fertilizer Recommendations For Western Nebraska -- CC 107

Soil Tests and Fertilizer Use -- EC 132

E. Seed Certification

Nebraska Certified Seed Handbook -- Published annually by the Nebraska Crop Improvement Association, College of Agriculture, Lincoln, Nebraska

F. Insect and Rodent Control

The Army Cutworm and the Variegated Cutworm -- EC 1504

New Insecticides for the Control of Grasshoppers -- EC 1507

The Hessian Fly and Its Control -- EC 1521

Stored Grain Insect Control -- EC 1552

Greenbugs and Their Control in Nebraska -- EC 1560

Rat Control on Nebraska Farms -- EC 1562

Grain is Food Keep It Clean -- CC 114

Grain is Food Keep Out Insects -- CC 115

Armyworm and Its Control -- USDA Farmers' Bulletin 1850

Insects in Farm Stored Wheat -- USDA Leaflet No. 345

G. Grain Diseases (see seed treatments)

Stem Rust of Wheat, Oats, Barley, and Rye -- EC 1802
Wheat Streak Mosaic, Its Cause and Control in Nebraska -- EC 56-1815

H. Weed Control

2, 4-D For Weed Control in Field Crops -- EC 198
Spray Equipment For Weed Control -- EC 174

I. Machinery Costs

Cost of Operating Farm Machinery on Nebraska Farms -- Experiment Station Bulletin 413
Custom Rates for Farm Machinery in Nebraska in 1956 -- EC 56-803

J. Harvesting

Operators' Manual For Your Machine -- Obtain from the manufacturer
Harvesting With Combines -- USDA Farmers' Bulletin 1761
Eliminate Hazards on Your Farm -- EC 792

K. Grain Drying and Storage

Drying Shelled Corn and Small Grain With Heated Air -- USDA Leaflet No. 331
Drying Shelled Corn and Small Grain With Unheated Air -- USDA Leaflet No. 332
Storage of Small Grains and Shelled Corn on the Farm -- USDA Farmer's Bulletin 2009
You Can Store Grain Safely On the Farm -- USDA Farmers' Bulletin 2071
Midwest Grain Storage Plans Catalog -- Complete set of plans are available from County Agents office.

L. Grain Marketing

Course of Study in Grain Grading -- Published by Seedburo Equipment Company, 618-626 West Jackson Blvd., Chicago 6, Illinois
4-H Grain Grading Demonstration -- Misc. Extension Publication No. 62 - USDA
Hedging -- An Insurance Medium in Marketing Agricultural Commodities -- Published by the Chicago Board of Trade, Chicago, Illinois
Handbook of Official Grain Standards of the United States -- USDA
Important Facts About the Grain Exchange -- Published by the Board of Trade, 141 West Jackson Blvd., Chicago, Illinois
Marketing Grain Through A Grain Exchange -- Published by the Chicago Board of Trade, Chicago, Illinois
The Story of Grain From Farm to You -- Published by the Omaha Grain Exchange, Omaha 2, Nebraska

Most of the above references may be obtained through the county agent's office. Other publications may be obtained by writing the publishers named. It is suggested that the leader be responsible for obtaining copies of the publications wanted; so they can be used by the members at club meetings in discussing problems involved.

M. Films and Movies

Black Scourge -- (sound) 11 minutes. Subject: Smut and other diseases of grain.
4-H Looks Forward -- (sound, color) 20 minutes. Subject: Story of boys and girls in 4-H and the development of their projects.
Grain Thieves -- (sound) 10 minutes.
Killing Weeds With 2, 4-D -- (sound). 20 minutes. Subject: Facts about 2, 4-D and how to use it safely.
Lost Harvest -- (sound, color) 20 minutes. Subject: Smut and Seed Treatment
Plant Growth -- (sound) 11 minutes. Subject: Growth of a pea plant.
Reconditioning a Grain Drill -- (sound) 30 minutes. Subject: How to maintain and operate a grain drill and its attachments.

Rural Rat Control -- (sound) 22 minutes.

Subject: How to control rats.

Seed Certification in Nebraska -- (sound, color) 32 minutes. Subject: The process of seed certification in Nebraska.

Stem Rust -- (sound, color) 22 minutes.

Subject: Story of rust and how to control it.

Strips and Curves -- (sound, color) 32 minutes. Subject: Control of wind and water erosion.

These and many additional films can be ordered from the University of Nebraska Audio-Visual Aids Department through the county extension office. A small service fee is charged.



AND LAST BUT NOT
LEAST, ALWAYS MAINTAIN
A SUPPLY OF GOOD SEED
AS EXPLAINED IN THE
DISCUSSION - "MAINTAINING
SEED SUPPLIES."